

**ABSTRACT**

This invention proposes a method for enabling segment protection, whereby one or more hops in the lightpath are protected by either a dedicated or shared wavelength. This provides a more cost effective solution for the service provider such that they only need to configure protection, and therefore deploy equipment, to those sensitive portions of the network rather than dedicating wavelengths and equipment for protection end-to-end for a lightpath. Further, allowing protecting wavelengths to be shared for protection, gives further flexibility and therefore, savings, to the service provider. To utilize lightpath segment protection and sharing the protection between multiple lightpaths requires the new mesh networking capabilities of the network elements and new network management tools to configure, and monitor these protected lightpaths.